

EDWARDS (W.R.) & WATERMAN (J.S.)

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REPORT OF A CASE,

With Remarks Upon the Amœba Coli.

BY

WILLIAM A. EDWARDS, M. D.

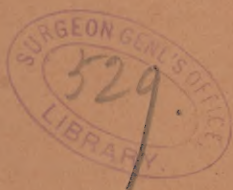
AND

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San Diego, California.

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HEPATIC ABSCESS

REPORT OF A CASE
WITH REMARKS UPON THE AMŒBA COLI.¹

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J. W.; laborer; aged forty-nine; was sent to Dr. Waterman from the mountain region of San Diego County with a diagnosis of impending typhoid fever, which examination soon proved to be erroneous. Family history negative; has a marked alcoholic habit; had gonorrhœa and a chancre eight years ago, an attack of dysentery in 1878, and another attack in 1882; not a robust man, but was able to work up to three weeks ago, when his present illness began in an attack of diarrhœa, rapid emaciation. Ten days ago had a slight chill; for several days has had four or five bloody movements, accompanied by considerable rectal tenesmus; pain in right hypochondriac region, pain in throat, and some difficulty in swallowing; no vomiting, but has eructations of food.

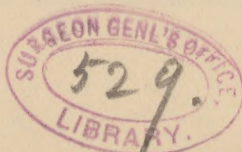
Physical Examination.—Emaciated and anæmic; tongue moist and coated with thick white fur.

Lungs.—Slight dulness anteriorly at both apices; posteriorly dulness and diminished respiration over right base.

Heart.—Normal in size and position; action regular, somewhat rapid; no murmur.

Liver.—Absolute dulness in fifth interspace, on nipple line; lower border of liver on line with umbilicus; posteriorly the liver dulness reaches to below costal arch. There is a tumefied mass occupying left side of right hypochondriac region, and right half of epigastric region; mass is hard, somewhat painful on pressure, gives a flat percussion note; no fluctuation appreci-

(1) The accompanying illustrations are reproduced through the courtesy of the University of Pennsylvania Press.



able; peritoneum adherent to mass (?); spleen not enlarged; abdomen retracted.

Rectal Examination.—Negative; prostate somewhat enlarged.

Pharynx and larynx somewhat enflamed; pulse 90; resp. 25; temperature 97°; urine, red, acid, 1025, no albumen, microscope showed a few red and white blood cells, epithelial cells and bile pigment.

A diagnosis of abscess of the liver was made. An aspirating needle was inserted into the tumor, below the free border of ribs, at the outer border of right rectus muscle. A cloudy serum and thick pus were obtained. Three hours after patient first came under our observation he was anæsthetized with chloroform, although collapse was imminent, temperature 97°. An incision three inches in length was made in line of puncture. Peritoneum was adherent. An opening about one and a half inches in length was made into abscess cavity, which was found to be filled with a reddish serum, thick stringy pus, and pieces of necrotic liver tissue; about thirty ounces were evacuated. Abscess cavity was irrigated with a 1-4000 bichloride of mercury solution, followed by hot water. It was then packed with iodoform gauze, a drain inserted, and wound dressed. Patient recovered from the anæsthetic fairly well, but his general condition did not improve, and notwithstanding liberal stimulation with heat, alcohol, digitalis and strychnia, he died in about four hours.

Autopsy.—Body of an ill-nourished man, panniculus adiposus almost absent, subcutaneous venous system dilated, no jaundice, marked anæmia, heart slightly dilated, right side normal, tricuspid valves dilated; left side, walls thick, slight atheroma of aorta near valves, mitral valves normal.

Lungs:—Left, intensely congested, heavy, apex and upper fourth of lower lobe contain a large indurated area, very dense and hard. There are numerous small tubercle-like nodules scattered through lower lobe. Many dense pleural adhesions. Right lung, dense adhesions everywhere, separated with great difficulty. Apex contains a large fibrous nodule, size of an orange. Lung is intensely congested and cedematous; glands at root are deeply pigmented and enlarged. Spleen:—Normal size, is softened and very friable. Kidneys:—Left, capsule slightly adherent. Organ nearly normal. Right, slightly larger than the left. Capsule not adherent, organ nearly normal. Liver:—

Adherent to the abdominal wall and to the surrounding viscera; left lobe not much enlarged, but shows signs of chronic parenchymatous inflammation. The bile ducts are surcharged with bile. Right lobe much increased in size, and contains five abscess cavities, three are very large and two somewhat smaller; they all contain pus, serum, and necrotic liver tissue. On the under surface of this lobe there is a hemorrhagic infarct, about 25 millimetres in diameter, not broken down but apparently of recent origin. The operation wound is seen about the median line of this lobe at a point corresponding to the dome of the liver. Gall-bladder is filled with a thin light colored bile, and the common bile duct is pervious.

The vermiform appendix is in an abnormal position, having fallen through an ovoid opening in the mesentery of the small intestine, taking a direction downward and into the pelvis, and is found two inches below the bifurcation of the aorta. About two feet above the cæcum there is a Meckel's diverticulum. The mucous membrane of the cæcum and whole colon to rectum, is covered with innumerable ulcers; some of these ulcers, especially in the caput, are recent, others are very deep subacute ulcers. The mucous membrane in places is gangrenous.

Hepatic abscess has a wide geographical distribution, it is not confined to any clime or any nation. It is, however, most common in the tropics; in tropical Asia, Africa, Egypt and Algiers, the disease is endemic, and constitutes five per cent of all diseases. Bartholow has found it very common in the valley of the Mississippi and its tributaries, and Delafield says it is common in New York City. Barendsprung found from the records of Berlin Path. Institute (1859 to 1873), 108 cases of hepatic abscess and lesions of the liver out of 7,326 autopsies, being 1.48 per cent. Bueckling in the same institute finds thirty-six cases of hepatic abscess, being 1.5 per cent. Satterwaite, in 251 autopsies at St. Luke's Hospital, reports 9 cases of hepatic abscess or nearly 3.6 per cent. Norman Moore, quoted by Harley, finds 20 cases out of 22,464 autopsies at St. Bartholomew's Hospital, less than 1 per cent. Musser (Transactions of Phila. Path. Soc., 1857 to 1881) in 430 cases where the condition of the liver was mentioned, found abscess thirteen times or nearly 3 per cent of the total. Mejia in 88,416 deaths for ten years in the City of Mexico, reports that 1,985 were due to sup-

purative hepatitis, a little over two per cent; these figures we are unable to verify and consequently assume no responsibility in reporting them. The Transactions of the Philadelphia Pathological Society, 1881 to 1887 inclusive, present 2 additional cases. Osler in the last two years has seen six or seven cases (personal communication).

Hepatic abscess is rare in children. Musser (Keating's Cycl.) has tabulated 34 cases in children under 15 years of age. We have been able to add but four more to this list, those reported by Ashby, Meckel, Mildner and Riveling and Stewart.

It is more common in men than in women, Eichorst says in the proportion of thirty to one. Nine cases at St. Luke's Hospital presented but one female. Roins' series contains 250 men and 8 women. Bartholow reports 12 cases, one a woman. Of Waring's 300 collected cases but 9 were women.

The abscess is most often located in the right lobe, or in both lobes; rarely in the left lobe alone. An analysis of 90 cases shows the site of the abscess to be the right lobe in 62 cases, the left lobe in 6 instances, and both lobes in 22. When we consider the large size of the right lobe as compared to the left—as six is to one—the larger capacity of the right branches of the portal vein, hepatic artery and hepatic duct, the fact that the veins of the gall-bladder usually empty into the right branch of the portal vein, and the more exposed situation of the right lobe, it will be readily understood why this lobe should be the most common seat of trauma, and why septic material should the more readily seek this lobe and find permanent lodgment there. In 297 cases observed by Jimenez, 198 were on the convex surface of the right lobe, with 242 deaths. (*The Satellite*, Feb., 1892.)

Hepatic abscess may be divided into two great classes: primary and secondary, the former including traumatic and the so-called idiopathic abscesses, the latter, metastatic, pyæmic and abscess by continuity and contiguity of tissue, and those due to the amoeba coli.

It has now been shown that the so-called primary or tropical abscess so common in India is due more to the habits of the individual, excesses in food and drink, than to the climatic conditions that for so long a time were considered the sole factors in its production. The disease is rare among the native population and common among the overfed, alcoholic English resi-

dents. As a further example, Sachs has shown that in Cairo, hepatic abscess is rare among the Mahomedans, and is found only among those who indulge to excess in alcoholics; this writer is further of the opinion that the same causes which will produce cirrhosis in a cold climate, will, in a hot environment, produce an acute purulent hepatitis.

As is well known, trauma may produce an abscess of the liver, but when the literature is somewhat carefully searched, one is surprised at the paucity of recorded cases of liver abscess following an injury. Thirty years' literature on this subject presents, according to Thierfelder, but 12 cases due to trauma; Louis and Andrell report one case and Musser (*ibid*) records 8 instances, John Harley one, Formad one, Rively and Stewart one. Whitaker's case was due to an injury of the wall of the thorax over the liver, Sheet's was due to a fractured rib. Barensprung's 108 examples of this disease present 13 traumatic cases.

A trauma or a suppurating focus may very readily be followed by abscess of the liver as the infection from the pus collection may be carried directly to the liver, either by the arterial circulation, through the hepatic artery, having, as a rule, been carried through the lungs and heart, or through the venous circulation by the portal vein, umbilical vein, or, as Eichorst would have us believe, by the action of gravity, entering the hepatic veins from the vena cava, and as Flint says, owing to the very low blood pressure and slowness of the circulation through the liver, we not infrequently have suppuration here when the lungs have escaped. On the other hand, Waldeyer finds that sixty-six and two-thirds per cent of the deaths from surgical diseases and injuries had pulmonary abscess, while only six per cent had hepatic abscess. At one time it was thought that there was a special relation between injuries of the head and hepatic abscess, but it has now been demonstrated that abscesses of the lungs are more frequent from this cause.

Another very prolific cause of the condition under consideration is biliary concretion, either in the gall-bladder or ducts. Barensprung records 11 cases under this head and Satterwaite, from a study of his 33 cases, concludes that after dysentery, this is the next most frequent cause of liver-abscess. Ogle records a case of abscess of the right lobe in which there was a mass of biliary concretions the size of hens' eggs; Harley has

recorded two similar cases, and Satterwaite one in which the common duct was occluded by stone causing ulceration and rupture.

While one of us was resident house-physician in the Bellevue Hospital, N. Y., a case of multiple abscess was observed in the service of W. B. James. Autopsy showed the duodenum to be adherent to the gall-bladder. The remains of the gall-bladder were found imbedded in a mass of cicatricial tissue; the bladder was about the size of a hickory nut and contained a large number of irregularly shaped gall-stones, lying in a collection of yellow pus; the hepatic ducts contained similar stones and pus. The liver weighed 6 lbs. 7oz. It contained numerous large and small collections of pus. Suppuration appeared to have followed the portal channels. The intestines were normal.

Ascarides entering the intestine through the common bile duct may cause suppuration. Musser has collected 8 such cases occurring in children. In Hornblower's case (*N. Y. Med. Rep.*, 1813) intestinal worms were discharged from an abscess of the liver. Bates' case presented 42 lumbricoid worms in the substance of the liver imbedded in an abscess. Suppurating hydatids have been recorded as etiological factors in the production of liver suppuration. Murchison and Harley have recorded such cases. Frequent mention is made in the books of abscess resulting from infection from the umbilical vein. With the means at our command, we are able to find but three cases, two of these are recorded by Thierfelder, and one is quoted by Musser as occurring in a child of one year of age.

Hepatic abscess has been observed as a sequel of the following conditions: Ulcerative endocarditis (Meyer), emboli from an aneurism or the bifurcation of the hepatic artery (Ross and Osler), abscess of the thymus in a child (Musser), encysted pyothorax (Thierfelder), splenic abscess, also bruise on left hip (Musser), specific (?) abscess over right internal malleolus (Harris, *Lancet*, 1887); in Barensprung's series, so often referred to, one followed a fracture of the femur, four pulmonary abscess and gangrene of lung, eight injuries of the head, and twenty-two injuries of other portions of the body; putrid bronchitis (Meyer); hepatic tuberculosis (Burton); Bruen's case (*Phila. Path. Soc.*, 1878) was apparently secondary to a subdiaphragmatic abscess, and Pepper's case (*ibid*, 1874) is incompletely reported in that no examination was made for the seat of pri-

mary suppuration; pancreatic abscess (Buckling), cancrroid of cesophagus (Tuengel), gastric ulcer (Bruen, Formad, Murchison, Bamberger), phlegmanous gastritis (Akerman), suppurating cancerous processes (Barensprung, five: one cancer of stomach, one cancer of pancreas, three, cancer of uterus and vagina), cancer of rectum (Dance), cancer of penis (Thierfelder).

Intestinal tuberculosis produced tubercular abscess in the liver in 12 cases (Bristow), suppurative inflammation of the portal vein, seven cases, thrombosis of the portal vein (Southy), pylephlebitis due to an impacted fishbone, two cases (Winge and Janeway), typhlitis and perityphlitis have furnished several interesting cases. Harley, Payne, Whipman, Ashby, Legg and Church have all reported cases where the typhlitis was caused by a pin lodging in or penetrating the appendix. Harley cites a case of Wettenger's where the typhilitis was caused by a fishbone, and several abscesses were found in the left lobe of the liver. Eskridge's case of paratyphilitis was followed by a liver abscess, and Fergus' case of perityphilitis became a general peritonitis and produced a suppuration of the liver. Ulcerative processes in the cæcum and appendix produced abscess in 8 of Barensprung's cases. Dunn reports a case of liver abscess in a child secondary to pelvic peritonitis; the abscess was incised, the child recovered. Lee's case (*N. Y. Path. Soc.*) was also due to a pelvic cellulitis. Proctitis (Bartholow), malaria (Emmus?), diabetes mellitus, phosphorus poisoning (Barensprung).

Typhoid fever does not by any means take the prominent place as a causative agent in the production of liver abscess that one would naturally suppose. Bueckling mentions two cases, Tuengel one, Harley one, Bernhard (quoted by Musser), one. Operations on the rectum have not infrequently caused the condition that we are considering. Dance reports one following an operation for fistula, Pirigoff one after an operation for prolapse, Cruvellier after forcible replacement of a neglected prolapsed rectum, Dance one that followed suppuration in a portion of the omentum that could not be replaced after a herniotomy, and Wilkes an abscess secondary to a suppurating rectal stricture.

Gonorrhœa has, in Harley's experience, been responsible for the production of an abscess in the liver.

Of all the diseases that are apt to cause liver abscess, dysentery beyond all doubt is the most important and is responsible

for more cases than all the other causes combined. Indeed, as early as 1842 George Budd stated that dysentery was a primary cause of hepatic abscess, and most of us to-day would feel inclined to agree with that statement. Moore in the *Annals of Military Surgery* reports 1,532 cases which, in 259 instances, were followed by liver abscess, being 19.2 p.c. Luchtinan in 102 autopsies, where abscess existed, found the following interesting facts: that in 11 cases the intestinal canal was normal, in 14 chronic catarrh of the colon existed, follicular ulcers of the colon in 52, follicular ulcers of the ilium 9, dysentery in various stages 16. Roins' observations are even more decided in that 90 per cent of the cases had dysentery (128 out of 143). The literature contains many other cases, notably those of Osler (three), Guiteras, Wilson, Formad, Bruen, Ridlon and Musser.

To recapitulate, hepatic abscess in a total of 699 cases reviewed in this paper has been observed in association with the following diseases in their order of frequency: Dysentery, 524 times; traumatism, 38; general injuries, 23; perityphlitis, 18; intestinal tuberculosis, 12; ascarides, 10; injuries to head, 8; pylephlebitis, 7; typhoid fever, 5; biliary concretions, 5; gastric ulcer, 5; cancer of stomach, 5; cancer of uterus and vagina, 4; gangrene of lungs and pulmonary abscess, 3; suppuration of umbilical vein, 3; hydatids, 2; operation for prolapse, 2. Space forbids a recapitulation of the causes in the remaining 26 cases. They are mentioned in the body of the paper.

A study of this series of cases will convince one that hepatic abscess is rarely if ever a primary disease, and that if cases are examined with great care a primary focus of suppuration will, in all probability, be found, and the chances are that it will be situated in the portal area. We have long since learned that the word idiopathic is of doubtful significance in the pathology of to-day, and as Harley says every form of hepatic abscess is invariably preceded by a recognizable cause and that the so-called idiopathic abscess may be only a form of metastatic abscess whose origin has eluded detection.

THE AMOEBA COLI.

The investigations of Kartulis, of Alexandria, *Centralblatt f. Bacteriologie und Parasitenkunde*, March 21st, 1891, foreshadowed by Lambe in 1852, and later by Losch in 1873, have now been confirmed in almost all parts of the world. At Prague by Hlava, Sonsino at Cairo, Grasse, Perroncito and Lontino in Italy, Klava in Austria, Cunningham and Lewis in India, Koch

and Gaffky in Germany. In Bohemia, in Greece and in America first by Osler, whose investigations are so painstaking and reliable, then by Councilman, Loeffleur, Simon, later Dock, Eichberg, Musser and Stengel, from whose article we will quote extensively and reproduce his illustrations of the different forms of the *amœba coli*. They are most readily seen in the fresh mucous stools of dysentery, most abundant in the yellowish and blood-streaked mucous particles, or in the shreds of necrotic tissue and have been frequently found in hepatic abscess, also in the expectoration of a case in which the pus burrowed from the liver into the bronchi (Osler). They may be readily seen with the one-sixth-inch objective and low eye-piece, and can be very satisfactorily studied with an immersion lens of one-twelfth-inch focus.

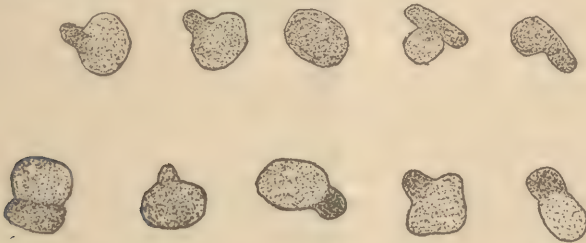


FIGURE 1.—Changes in an *Amœba* found in a case of endemic dysentery. The changes of shape and production of pseudopodia are represented, also the massing and flowing of the granular matter. (Stengel.)
Observed for four minutes.

The amoeba is a pale, somewhat granular protoplasmic mass varying in size from 12 micromillimetres to 35 micromillimetres, Losch and Kartulis (10 micromillimetres to 20 micromillimetres, Osler). It varies in size from five to ten times that of a red blood corpuscle.

At rest the body presents two zones, an outer or mucous-like layer and an inner granular matter; the former the translucent homogenous ectosarc or motile portion, the latter the granular endosarc containing the nucleus, vacuoles and granules as described by Osler. When active the amoeba sends out pseudopodia which are illustrated in figure 1.

The number of pseudopodia rarely exceeds three or four, generally but one or two. The manner of projection of these pseudopodia is important and serves in distinguishing the organism, in the *amœba coli* it is always forward and backward in the same line.

The motion of the pigment granules within the amoeba is a

striking feature; it is dancing, rapid and constant, and resembles the motions seen in Lavarán's germ—the plasmodium malariae. This motion is unceasing until the death of the organism. The nucleus measures from 4.8 micromillimetres to 6.8 micromillimetres in diameter and occasionally contains a nucleolus; there may be one or as many as ten vacuoles in a single amoeba, their size may vary from the most minute to half the size of the organism itself. On the other hand these vacuoles may be entirely absent; this is particularly true of the amoeba found in the pus of liver abscess.

Cunningham has called attention to an encysted form, illustrated in figure 2, A and B.



FIGURE 2.

These are met with when the surrounding conditions are not such as favor the life of the organism, the amoeba is now dormant, but ready to assume active life.

The amoeba probably reproduces itself, both by the common method of cell division and by sporulation. The latter method is illustrated by figure 3.

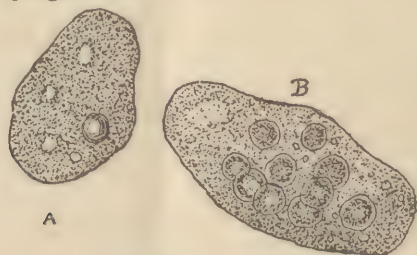


FIGURE 3.—Sporulation.

The evidence at our command to date seems to be strongly in favor of the statement that the amoeba bears a direct causative relation to the production of liver abscess, as Stengle remarks: "It seems certain that post-dysenteric abscesses result from the action of micro-organisms conveyed to the liver by the amœbæ, and that the organism may play some part in the tissue-destruction."

LITERATURE.

The more recent contributions to the literature of Hepatic Abscesses are as follows:

- BETTELHEIM—*Leberabscess. Deutsches Archiv f. Klinische Medizin*, Band XLVIII, Heft 3 v. 4, 1891.
- PEASE—*Weekly Med. Rev.*, St. Louis, 1891, XXIII, 243.
- SCHMIDT—*Ueber Leberabscess*, Bonn, 1890, J. Bach, Vienna, p. 43, 8°.
- ALTOBELLI—*Boll. de. clin.*, Milano, 1891, VIII, 58-62.
- PECORARO—*Sicilia Med.*, Palermo, 1890, 11, 701-724.
- SALE—*Med. Press and Circ.*, London, 1891, n. s. LI, 349.
- KALENDERU—*Clinica*, Bucuresci, 1891, 11, 37; 61; 85.
- LEO—*Arch. de Med. Nav.*, Par., 1891, LV, 265-277.
- MACKENZIE—*Tr. Path. Soc.*, Lond., 1889-90, XLI, 156-160.
- PEYROT—*Bull. et Mem. Soc. de Chir.*, de Par., 1891, n. s., XVII, 39-45.
- REDMOND—*Tr. Royal Acad. Med.*, Ireland, Dubl., 1890, VIII, 397-399.
- VILLARI—*Med. Rec.*, N. Y., 1891, XXXIX, 522.
- WEST—*Tr. Path. Soc.*, Lond., 1889-90, XLI, 146-152.
- GABRIEL—*Lancet*, Lond., 1891, 1, 1149.
- RHO—*Gior. Med.*, d. r., *esercito, etc.*, Roma, 1891, XXXIX, 145; 289.
- BORGER—*Munchen*, 1891, Lehmann, p. 19.8°.
- EICHBERG—*Med. News*, Phila., 1891, LIX, 201-205.
- MORRIS—*Lancet*, Lond., 1891, II, 175.
- XIBILIA—*Sicilia Med.*, Torino-Palermo, 1891, III, 174-194.
- ROUGHTON—*Lancet*, Lond., 1891, II, 417-419.
- WILSON—*North Carolina Med. J.*, Wilmington, 1891, XXVIII, 95-97.
- ZUBKOVSKI—*Russk. Med.*, St. Petersburg, 1891, XVII, 236-239.
- AUBERT—*Par.*, 1891, p. 78, 4°, No. 285.
- DANIN—*Par.*, 1891, p. 48, No. 320, 4°.
- CATTLE—*Lancet*, Lond., 1891, II, 804.
- BROCA—*Gaz. hebd. de Med.*, Par., 1891, 2 s., XXVIII, 474-476.
- BERTRAND—*Gaz. hebd. de Med.*, Par., 1891, 2 s., XVIII, 43; 54; 65.
- VEILLON ET JAYLE—*Compt. rend. Soc. de Biol.*, Par. 9, s., III, 3.
- CORONADO—*Progreso Med.*, Habana, 1890, II, 145-155.
- DOUGLAS—*South. M. Rec.*, Atlanta, 1890, XX, 541-549.
- SIMON—*Johns Hopkins Hosp. Bull.*, Baltimore, 1889-90, I, 97.
- ALTOBELLI—*Gior. internaz. de sc. Med.*, Napoli, 1890, 2 s., XII, 645-649.
- HARDEN—*Tr. Med. Soc.*, W. Virg., Wheeling, 1890, 757.
- MIRANDE—*Bordeaux*, Par., 1890, p. 64, I, diag. 4°, No. 22.
- LEO—*Arch. de Med. Nav.*, Par., 1890, LIV., 427-445.
- SHATTUCK—*Boston Med. and Surg. Jour.*, 1891, CXXIV, 3-5.

- TOURNIER—*Province, Med.*, Lyon, 1890, IV., 556.
- McCONNELL—*Montreal Med. Jour.*, Dec., 1891.
- The literature of *Amœba Coli* is as follows:
- STENGLE—*Med. News*, Nov. 15, 1890.
Univ. Med. Mag., Dec. 1891 and Jan., 1892.
- DOCK—*Daniel's Texas Med. Journal*, Feb., 1891.
New York Med. Rec., July 4, 1891.
- LAMBL—*Aus dem Franz Joseph Kinderspital in Prag*, I Theil.
Prager Viertel jahrssch f. Prakt. Heilk., Bd., LXI,
 S., 51.
- LEWIS—*Appendix A. Sixth Annual Report of the Sanitary
 Commissioner with the Government of India, Cal-
 cutta*, 1870.
- CUNNINGHAM—*Appendix B. Seventh Annual Report of the
 Sanitary Commissioner with the Government
 of India, Calcutta*.
- LOSCH—*Arch. Virch. f. Path. Anat.*, Bd., LXV, 1875.
- GRASSI—*Gazette Med. Ital.*, Lomb. 45, 1879.
- PERRONCITO—*I Parassiti*, Milan, 1879.
- KOCH—*Gaffky's Bericht zur Erf. der Cholera*, 1883.
- KARTULIS—*Virch. Arch. f. Path. Anat.*, Bd., XCIX. 1885.
Virch. Arch. f. Path. Anat., Bd., CV. 1886.
Virch. Arch. f. Path. Anat., Bd., CXVIII.
Centralbl. f. Bakt. u. Parasitenk., etc., Bd., II, No. 25.
Centralbl. f. Bakt. u. Parasitenk., etc., Bd. VII, No. 25.
 (Abstract) *Centralbl. f. Bakt. u. Parasitenk.*, etc.,
 Bd., VII, No. 6, 1890.
Centralbl. f. Bakt. u. Parasitenk., etc., Bd., IX,
 No. 3, 1891.
- HLAVA—*Zeitsch. d. Boehm. Aerzte in Prag*, 1887.
 Abstract in *Centralbl. f. Bakt. u. Parasitenk.* Bd., I,
 No. 18.
- LEUKART—*The Animal Parasitis*, Trans. by Hoyle, 1886.
- MASSINTIN—*Wratsch*, 1889, No. 25.
 Abstract in *Centralbl. f. Bakt. u. Parasitenk.*,
 Bd., VI.
- OSLER—*Centralbl. f. Bakt. u. Parasitenk.*, Bd., VII, No. 23,
 1890.
Johns Hopkins Hosp. Bulletin, Vol. I, p. 53, 1890.
Johns Hopkins Hosp. Bulletin, Vol. I, p. 90, 1890.
- LAFLEUR—*Johns Hopkins Hosp. Bulletin*, Vol. I, p. 91, 1890.
Johns Hopkins Hosp. Bulletin, Vol. II, 1891.
- SIMON—*Johns Hopkins Hosp. Bulletin*, Vol. I, 1890.
- MUSSER—*University Medical Magazine*, Dec., 1890.
- COUNCILMAN—*Journ. Am. Med. Assoc.*, June 6, 1891.
- EICHBERG—*Med. News*, Aug. 22, 1891.
- WASDIN—*Medical News*, 1891, Vol. LIX, No. 23.
- EDITORIAL—*Med. News*, July 25, 1891.
- COUNCILMAN AND LAFLEUR—*Johns Hopkins Hospital Reports*,
 Nos. VII, VIII and IX with six plates.

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"The strongest testimonial that a man can present is the opinion of his neighbor."—Emerson.

REFERENCES

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- WILLIAM PEPPER, M. D., LL. D., Philadelphia, Provost and Prof. of Theory and Practice of Medicine, Univ. of Pennsylvania.
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